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(54) STRETCHABLE COMPOSITE NONWOVEN FABRIC AND ABSORBING ARTICLE USING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a nonwoven fabric excellent in hand feeling, having high elongation recovering properties and suitable for uses as sanitary goods such as diapers, and the like, and bandages, base fabrics for catapasm, and the like.

SOLUTION: This stretchable composite nonwoven fabric is a laminated nonwoven fabric comprising a nonwoven fabric (I) in which thermoplastic conjugate fibers obtained by using a resin (B) and a resin (A) having a lower melting point than that of the resin (B) are interlaced while expressing three dimensional crimps and a nonwoven fabric (II) comprising thermoplastic fibers obtained by using a resin (A') having a lower melting point than that of the aforesaid resin (A) arranged on one side or both sides of the nonwoven fabric (I). The nonwoven fabric (I) and the nonwoven fabric (II) are partly heat combined by heat fusion of the aforesaid thermoplastic fibers obtained by using the resin (A'), and percentages of elongation recovery at 20% elongation in the longitudinal and lateral directions of the laminated nonwoven fabric are both $\geq 90\%$.

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CLAIMS

[Claim(s)]

[Claim 1] The nonwoven fabric with which the thermoplastic compound continuous glass fiber obtained using resin (B) and the resin (A) which has the melting point lower than resin (B) is discovering and interlacing three-dimensions crimp (I), It is the laminating nonwoven fabric which arranged the nonwoven fabric (II) which consists of thermoplastic fiber obtained to one side or both sides of this nonwoven fabric (I) using the resin (A') which has the melting point lower than said resin (A). The elasticity compound-ized nonwoven fabric which the partial thermal bond of a nonwoven fabric (I) and the nonwoven fabric (II) is carried out by the thermofusion of said thermoplastic fiber obtained using resin (A'), and is characterized by each expanding recovery factor at the time of 20% expanding of the lengthwise direction of this laminating nonwoven fabric and a longitudinal direction being 90% or more.

[Claim 2] The elasticity compound-ized nonwoven fabric according to claim 1 whose resin (A) and resin (A') of a laminating nonwoven fabric are the same component system resin.

[Claim 3] resin (A) and resin (A') — low density polyethylene, straight chain-like low density polyethylene, high density polyethylene, and a propylene system — duality — the elasticity compound-ized nonwoven fabric according to claim 1 or 2 which are at least one sort of olefin system resin chosen from the copolymer and the propylene system ternary polymerization object.

[Claim 4] The elasticity compound-ized nonwoven fabric of claims 1-3 which are the nonwoven fabrics with which a nonwoven fabric (I) consists of thermoplastic compound continuous glass fiber which has the fiber cross section of a side-by-side mold or an eccentric sheath-core type given in any 1 term.

[Claim 5] a propylene system — duality — the propylene/ethylene with which a copolymer includes an ethylene unit for a propylene unit one to 15% of the weight 85 to 99% of the weight — duality — the elasticity compound-ized nonwoven fabric according to claim 3 which is a copolymer.

[Claim 6] a propylene system — duality — the propylene/butene-1 in which a copolymer includes a butene-1 unit for a propylene unit one to 50% of the weight 50 to 99% of the weight — duality — the elasticity compound-ized nonwoven fabric according to claim 3 which is a copolymer.

[Claim 7] The elasticity compound-ized nonwoven fabric according to claim 3 which are the propylene / ethylene / butene-1 ternary polymerization object with which a propylene system ternary polymerization object includes a propylene unit 84 to 98% of the weight, and includes a butene-1 unit for an ethylene unit one to 15% of the weight one to 10% of the weight on the weight criteria of this ternary polymerization object.

[Claim 8] Absorptivity goods using the elasticity compound-ized nonwoven fabric of claim 1-7 given in any 1 term.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the absorptivity goods which used an elasticity compound-ized nonwoven fabric and this. Furthermore, it is related with the absorptivity goods using the elasticity compound-ized nonwoven fabric and this which are rich in expanding recoverability and excellent in aesthetic property and a moldability in detail etc.

[0002]

[Description of the Prior Art] Since nonwoven fabric strength is highly excellent in productivity compared with the staple fiber nonwoven fabric which makes a staple fiber configuration fiber, the span bond nonwoven fabric which makes continuous glass fiber configuration fiber can make the price cheap, and is used for various applications. A disposable diaper etc. has high utility value as facing of hygienic goods especially.

[0003] However, since the filament used was non-crimp while it has high strength, these span bond nonwoven fabric was inferior to the loft compared with the staple fiber nonwoven fabric, and the problem was in aesthetic property. For this reason, the amount used for the facing of hygienic goods etc. is changing in few condition compared with a staple fiber nonwoven fabric from the point of a high-class feeling.

[0004] On the other hand, after the staple fiber nonwoven fabric made into dominance at a loft or aesthetic property generally uses a heat adhesive property bicomponent fiber as a web according to a card process or an airstream filamentation process, it is manufactured by welding a fiber confounding point by heat-treatment of hot blast processing, thermocompression bonding processing (embossing), etc. Thermocompression bonding processing is excellent in productivity compared with hot blast processing, and especially advantageous also in cost. However, softer aesthetic property (tactile feeling) is demanded of the staple fiber nonwoven fabric which is used for the facing of hygienic goods and by which thermocompression bonding was carried out as a recent trend. Therefore, processing which stopped heat treatment temperature is performed. However, as a result, the so-called fuzz to which it becomes inadequate pasting up a nonwoven fabric, and nonwoven fabric strength is weak, it becomes easy to damage a part for jointing, and the edge of a staple fiber projects on a nonwoven fabric front face tends (wear-resistant fall) to happen. Moreover, the thickness (loft) of the nonwoven fabric with which the staple fiber nonwoven fabric by which thermocompression bonding was carried out is obtained will be regulated by the height of embossing heights, and, for this reason, the nonwoven fabric bulky enough was hard to be obtained.

[0005] Moreover, even if the nonwoven fabric obtained by the conventional heat-treatment had extensibility, it was a thing inferior to elasticity ***** expanding recoverability or a loft. Therefore, examination of a nonwoven fabric which has each features of the staple fiber nonwoven fabric which makes configuration fiber the span bond nonwoven fabric which makes continuous glass fiber configuration fiber, and a staple fiber is made, and the various manufacture approaches are proposed in the span bond nonwoven fabric advantageous to especially productivity.

[0006] The method of giving crimp to the continuous glass fiber which is configuration fiber as an

approach of giving a loft to a span bond nonwoven fabric at JP,1-148862,A is proposed. In case this carries out melt spinning of the macromolecule polymer from a spinneret with a variant spinning hole and subsequently carries out extension solidification by the high-speed flow, after it makes a continuous glass fiber group discover crimp by carrying out cooling processing of one side face of this continuous glass fiber group, it carries out heat adhesion of this continuous glass fiber group, and is the manufacture approach of the span bond nonwoven fabric made to unify. By the crimp of continuous glass fiber, the volume of continuous glass fiber spacing becomes large, and the loft of this effectiveness improves.

[0007] Although the span bond nonwoven fabric obtained by this approach is flexible bulky compared with the span bond nonwoven fabric of non-crimp, the crimp nature continuous glass fibers which adjoin at the time of filamentation become entangled, filamentation becomes poor, and the nonwoven fabric of good formation is hard to be obtained. Moreover, since thermocompression bonding was carried out, ** will be regulated by the height of embossing heights and the obtained nonwoven fabric was not enough about a loft, either.

[0008] In order to compensate this fault, the small continuation continuous glass fiber web of a heat shrink is united with both sides of the large continuation continuous glass fiber web of a heat shrink by thermocompression bonding behind a laminating, and the manufacture approach of the span bond nonwoven fabric which heat-treats further and carries out a heat shrink is proposed by JP,8-176947,A after that.

[0009] In order the filamentation nature at the time of spinning is good since continuation continuous glass fiber is non-crimp, and to heat-treat after thermocompression bonding and to make it contract by this approach, The nonwoven fabric which heat-treated the nonwoven fabric since the continuous glass fiber to constitute consisted of resin of a single component, although a bulky nonwoven fabric is obtained since the ** is not regulated by the height of embossing heights, and was contracted was non-crimp nature fiber which fiber itself contracts, and even if there was extensibility, it had the fault of being inferior to expanding recoverability. Moreover, since it was necessary to process it at the temperature which the large continuation continuous glass fiber of a heat shrink does not contract in case thermocompression bonding is carried out and fixing between laminatings is performed, the working temperature range was narrow and the bond strength between nonwoven fabrics was not a satisfying enough thing.

[0010]

[Problem(s) to be Solved by the Invention] It is in the purpose of this invention offering the absorptivity goods using the bulky elasticity compound-ized nonwoven fabric and bulky it excellent in expanding recoverability and aesthetic property by which the above-mentioned technical problem was canceled.

[0011]

[Means for Solving the Problem] As a result of repeating examination wholeheartedly that the above-mentioned technical problem should be solved, by adopting the following configurations, this invention persons acquire the prospect that the desired end is attained, and came to complete this invention.

(1) The nonwoven fabric with which the thermoplastic compound continuous glass fiber obtained using resin (B) and the resin (A) which has the melting point lower than resin (B) is discovering and interlacing three-dimensions crimp (I), It is the laminating nonwoven fabric which arranged the nonwoven fabric (II) which consists of thermoplastic fiber obtained to one side or both sides of this nonwoven fabric (I) using the resin (A') which has the melting point lower than said resin (A). The elasticity compound-ized nonwoven fabric which the partial thermal bond of a nonwoven fabric (I) and the nonwoven fabric (II) is carried out by the thermofusion of said thermoplastic fiber obtained using resin (A'), and is characterized by each expanding recovery factor at the time of 20% expanding of the lengthwise direction of this laminating nonwoven fabric and a longitudinal direction being 90% or more.

(2) The elasticity compound-ized nonwoven fabric given [aforementioned] in (1) term the given resin (A) and the resin (A') of a laminating nonwoven fabric are the same component system resin.

(3) resin (A) and resin (A') — low density polyethylene, straight chain-like low density

polyethylene, high density polyethylene, and a propylene system — duality — the aforementioned (1) term which are at least one sort of olefin system resin chosen from the copolymer and the propylene system ternary polymerization object, or an elasticity compound-ized nonwoven fabric given [aforementioned] in (2) terms.

(4) The elasticity compound-ized nonwoven fabric of the aforementioned (1) – (3) term which is the nonwoven fabric with which a nonwoven fabric (I) consists of thermoplastic compound continuous glass fiber which has the fiber cross section of a side-by-side mold or an eccentric sheath-core type given in any 1 term.

(5) a propylene system — duality — the propylene/ethylene with which a copolymer includes an ethylene unit for a propylene unit one to 15% of the weight 85 to 99% of the weight — duality — the elasticity compound-ized nonwoven fabric given [aforementioned] in (3) terms which is a copolymer.

(6) a propylene system — duality — the propylene/butene-1 in which a copolymer includes a butene-1 unit for a propylene unit one to 50% of the weight 50 to 99% of the weight — duality — the elasticity compound-ized nonwoven fabric given [aforementioned] in (3) terms which is a copolymer.

(7) The elasticity compound-ized nonwoven fabric given [aforementioned] in (3) terms which is the propylene / ethylene / butene-1 ternary polymerization object with which a propylene system ternary polymerization object includes a propylene unit 84 to 98% of the weight, and includes a butene-1 unit for an ethylene unit one to 15% of the weight one to 10% of the weight on the weight criteria of this ternary polymerization object.

(8) Absorptivity goods using the elasticity compound-ized nonwoven fabric of the aforementioned (1) – (7) term given in any 1 term.

[0012]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The nonwoven fabric with which the elasticity compound-ized nonwoven fabric of this invention consists of thermoplastic compound continuous glass fiber of heat quantity shrinkage characteristics which has potential crimp nature (I), By carrying out the laminating of the nonwoven fabric (II) which becomes the one side or both sides from the thermoplastic fiber of **** shrinkage characteristics, and heat-treating at the crimp temperature of a nonwoven fabric (I) further, after thermocompression bonding's carrying out the partial thermal bond of both and carrying out laminating unification It is the elasticity compound-ized nonwoven fabric with which thermoplastic compound continuous glass fiber with the potential crimp nature which constitutes said nonwoven fabric (I) is discovering and interlacing three-dimensional three-dimensions crimp.

[0013] In detail furthermore, the elasticity compound-ized nonwoven fabric of this invention To one side or both sides of a nonwoven fabric (I) and this nonwoven fabric (I) to which the thermoplastic compound continuous glass fiber which consisted of resin (A) and resin (B) is discovering and interlacing three-dimensions crimp It is the laminating nonwoven fabric which arranged the nonwoven fabric (II) which consists of thermoplastic fiber obtained using the resin (A') which has the melting point lower than said resin (A). The partial thermal bond of a nonwoven fabric (I) and the nonwoven fabric (II) is carried out by the thermofusion of said thermoplastic fiber obtained using resin (A'), and each expanding recovery factor at the time of 20% expanding of the lengthwise direction of a laminating nonwoven fabric and a longitudinal direction has 90% or more.

[0014] That is, the compound continuous glass fiber of heat quantity shrinkage characteristics which has potential crimp nature is used for the thermoplastic compound continuous glass fiber which constitutes the nonwoven fabric (I), and the fiber of **** shrinkage characteristics is used for the thermoplastic fiber which constitutes one nonwoven fabric (II) from said bicomponent fiber. One side or both sides of this nonwoven fabric (I) are made to carry out the laminating of the nonwoven fabric (II), partial thermocompression bonding of both is carried out by the thermofusion of the resin (A') which constitutes the thermoplastic fiber of a nonwoven fabric (II), and junction unification is carried out. Then, a heat shrink is carried out and crimp is made to discover by heat-treating to the thermoplastic compound continuous glass fiber which

constitutes the nonwoven fabric (I). In this case, the nonwoven fabric which forms a spacial configuration and is excellent in expanding recoverability is obtained, so that the differential shrinkage of thermoplastic compound continuous glass fiber and thermoplastic fiber is large. Moreover, temperature lower 5–30 degrees C than the melting point of the resin (A) which constitutes this thermoplastic compound continuous glass fiber is used for the temperature which makes thermoplastic compound continuous glass fiber discover crimp, i.e., crimp temperature. To thermoplastic compound continuous glass fiber, three-dimensions crimp is discovered with this heat-treatment, it sees, and die length contracts. That is, a nonwoven fabric (II) is dragged with the heat shrink stress of the thermoplastic compound continuous glass fiber which constitutes the nonwoven fabric (I), and a surface appearance comes to have a loose wave condition (depending on the case, it is the shape of a crepe). under the present circumstances, omission of fiber according to a three-dimensions crimp manifestation since the thermoplastic compound continuous glass fiber which discovered three-dimensions crimp consists of continuous glass fiber nonwoven fabrics and the so-called base — there is no omission and nonwoven fabric strength becomes high.

[0015] Since the elasticity compound-ized nonwoven fabric of this invention has a bulky spacial configuration, it has very soft aesthetic property, and both a lengthwise direction and a longitudinal direction have the outstanding engine performance of 90% or more in the expanding recovery factor at the time of 20% expanding. When the elasticity compound-ized nonwoven fabric of this invention is used as secondary products, such as absorptivity goods, such as a diaper, and a base fabric of dressings and HAPPU material, and it stands on a wearer's human-engineering-standpoint and thinks at the same time the outstanding aesthetic property is given, 90% or more of this expanding recovery factor expands and contracts that there is no unreasonableness also at the time of the posture migration at the time of wear, and since it can follow, it does not give a wearer displeasure.

[0016] In the elasticity compound-ized nonwoven fabric of this invention, thermocompression bonding processing is desirable as an approach of unifying a nonwoven fabric (I) and a nonwoven fabric (II). Since thermocompression bonding processings are heat and the processing approach by the pressure compared with hot blast processing, they have an advantage processible at temperature lower than the melting point of the resin (A') to paste up. That is, in case the laminating unification of the thermoplastic compound continuous glass fiber which has potential crimp is carried out by thermocompression bonding processing, since a contraction operation does not occur with the heat at the time of thermocompression bonding, it is used suitably. In addition, as for the conditions of thermocompression bonding processing, the thermocompression bonding working temperature more than the softening temperature of resin (A') and the linear pressure of 10–100Ns/mm are usually chosen suitably. Moreover, the area of the welding area which carries out thermocompression bonding has 4 – 30% of desirable range to the nonwoven fabric area before crimp processing, and is 5 – 25% more preferably. If the area of a welding area is in the inclination which interlaminar peeling between nonwoven fabric laminatings produces at less than 4% and 30% is exceeded sharply, a crimp operation will be checked, and it becomes the inclination to stop a loft.

[0017] In this invention, the resin (A) of a nonwoven fabric (I) can use resin (A') as an adhesion component, when the melting point is higher than the resin (A') of a nonwoven fabric (II), and it can weld by thermocompression bonding, and a contraction operation of a nonwoven fabric (I) is controlled, the partial thermal bond between laminatings becomes firm further, and interlaminar peeling can be controlled. However, when the melting point of resin (A') is conversely higher than resin (A), dimensional stability is spoiled in welding or adhesion as a result of a lifting for that a nonwoven fabric (I) causes contraction with the heat of heating processing in case thermocompression bonding of the resin (A') is carried out, and continuous glass fibers, and a thermoplastic bicomponent fiber stops being able to discover solid crimp further easily fully at the time of crimp processing. As combination of resin (A) and resin (A'), the same component system resin which has a melting point difference is still more advantageous to the exfoliation prevention between laminatings.

[0018] The polyethylene resin usually industrially used as the resin (A) used for this invention

and resin (A') is used preferably, the low density polyethylene of 0.910 – 0.925 g/cm³ and a consistency can illustrate the straight chain-like low density polyethylene of 0.926 – 0.940 g/cm³, and a consistency can illustrate [a consistency] the high density polyethylene of 0.941 – 0.980 g/cm³. The range of a melt flow rate (value measured based on the conditions 4 in MI:JIS K7210 table 1) for 2–100g / 10 minutes is desirable. It is arbitrary and the resin (A) of thermoplastic compound continuous glass fiber and the resin (A') which has the melting point lower than this can be chosen from the inside. In addition, the melting point difference of resin (A) and resin (A') has desirable 3 degrees C or more, and it is 5 degrees C or more more preferably.

[0019] the propylene system used for resin (A) and resin (A') in this invention — duality — with a copolymer and a propylene system ternary polymerization object A propylene is used as a principal component and it is a crystalline copolymer with alpha olefin of it, little ethylene, butene-1, a hexane -1, octene -1, or 4-methyl ** NTEN-1 grade. The range whose melt flow rates (value measured based on the conditions 14 in the MFR:JIS K7210 table 1) are 3–50g / 10 minutes and whose melting point is 120–158 degrees C is used suitably. the propylene/ethylene which makes a subject the propylene which includes an ethylene unit for a propylene unit one to 15% of the weight 99 to 85% of the weight as an example — duality — a copolymer — the propylene/butene-1 which makes a subject the propylene which includes a butene-1 unit for a propylene unit one to 50% of the weight 99 to 50% of the weight — duality — a copolymer — Or the propylene / ethylene / butene-1 ternary polymerization object which includes a propylene unit 84 to 98% of the weight, and includes a butene-1 unit for an ethylene unit one to 15% of the weight one to 10% of the weight on the weight criteria of a ternary polymerization object are mentioned. It is arbitrary and resin (A) and the resin (A') which has the melting point lower than this can be chosen from the inside. The melting point difference of said resin (A) and resin (A') has desirable 3 degrees C or more, and it is 5 degrees C or more more preferably.

[0020] The resin (B) which constitutes the thermoplastic compound continuous glass fiber used for this invention is arbitrary, and can choose the thermoplastics which has the melting point high at least 10 degrees C or more from said resin (A). Gay polypropylene or a propylene is preferably used as a principal component, it is a crystalline copolymer with alpha olefin of it, little ethylene, butene-1, a hexane -1, octene -1, or 4-methyl ** NTEN-1 grade, and the thing whose MFRs are 2–150g / 10 minutes and whose melting point is 130–158 degrees C is useful.

[0021] The thermoplastic compound continuous glass fiber used for this invention is the continuous glass fiber of potential crimp nature, and it is suitably manufactured by the span bond method, and it deals in it. The thermoplastic compound continuous glass fiber which specifically consists of resin (A) with which the rates of a heat shrink differ, and resin (B) as thermoplastic compound continuous glass fiber with potential crimp is mentioned. The melting point is the compound continuous glass fiber arranged on the eccentric sheath-core type which uses two sorts of thermoplastics different 10 degrees C or more as a side-by-side mold, and uses resin (A) as a sheath component, and the structure of this compound continuous glass fiber can make three-dimensional three-dimensions crimp discover by heat-treating at the temperature below the melting point of resin (A), especially in a temperature requirement lower 5–30 degrees C than the melting point of resin (A) (crimp processing). Said temperature requirement was made into crimp temperature in this invention.

[0022] In order to obtain the thermoplastic compound continuous glass fiber of a nonwoven fabric (I) in this invention, the above-mentioned resin (A) and resin (B) can be manufactured by the well-known span bond method using the spinneret used as the cross section of a side-by-side mold and an eccentric sheath-core type. Under the present circumstances, in the case of the spinneret of a side-by-side mold, by changing the extrusion temperature (spinning temperature) of resin (A) and resin (B), the spinning melt flow rate of resin (A) and resin (B) is adjusted, and **** of the fiber cross section of resin (A) and resin (B) is set up. The weight ratio has [the ratio of the resin (A) which constitutes compound continuous glass fiber, and resin (B)] desirable (Resin A) / (Resin B) = 20 / 80 – 80/20% of the weight of range, and they are 40 / 60 – 60/40 % of the weight more preferably. When resin (A) performs crimp processing at less than 20%, it is hard to discover solid crimp and elongation recoverability becomes scarce.

Moreover, if resin (A) exceeds 80%, contraction will take place at the time of thermocompression bonding, and it will become the inclination for dimensional stability to fall. The fineness of thermoplastic compound continuous glass fiber has the desirable range of 0.55 – 11dtex, and it is 0.55 – 6dtex more preferably. The eyes of a nonwoven fabric (I) have the desirable range of 5 – 40 g/m², and it is 8 – 30 g/m² more preferably. Obtaining still more uniform formation becomes [the spinnable properties by which single-yarn fineness was stabilized in less than 0.55 dtexes at the time of spinning] are hard to be obtained difficult. On the other hand, if 11dtex is exceeded, it will become the inclination for the touch of a nonwoven fabric to get remarkably bad. Moreover, if eyes cannot acquire nonwoven fabric strength sufficient in less than two 5 g/m but exceed 40 g/m², nonwoven fabric strength will become the inclination to come out enough and for the touch of a certain thing to worsen.

[0023] As long as it is thermoplastic fiber obtained using the resin (A') which has the melting point of under the melting point of resin (A) as thermoplastic fiber which constitutes the nonwoven fabric (II) used for this invention, you may be what kind of fiber configuration. For example, you may be a staple fiber and continuous glass fiber, and a single fiber and a bicomponent fiber are sufficient as the resin configuration of fiber. When a fiber configuration is a bicomponent fiber, the same resin configuration as the above-mentioned thermoplastic compound continuous glass fiber may be used. If resin (A') is the same component system resin as resin (A), fixing between the nonwoven fabric laminatings of a nonwoven fabric (I) and a nonwoven fabric (II) becomes stronger, and it is very more desirable still. Moreover, the eyes of a nonwoven fabric (II) are eyes ratios (eyes of the eyes/nonwoven fabric (I) of a nonwoven fabric (II)) with the nonwoven fabric (I) which carries out a laminating, and being set to 0.2–4 is desirable. It is 0.3–3 especially preferably. When an eyes ratio exceeds 4, in order to make crimp discover, it is hard coming to be discovered of the solid crimp of a nonwoven fabric (I) with a nonwoven fabric (II), when it heat-treats.

[0024] To the resin (A) used by this invention, resin (A'), and the thermoplastics of resin (B), an antioxidant, light stabilizer, an ultraviolet ray absorbent, a neutralizer, a nucleating agent, an epoxy stabilizer, an unguent, an antimicrobial agent, a flame retarder, an antistatic agent, a pigment, a plasticizer, a hydrophilic agent, etc. may be further added if needed suitably within limits which do not bar this effectiveness.

[0025] The elasticity compound-ized nonwoven fabric of this invention is excellent in bulky at aesthetic property, has still higher expanding recoverability, and can offer the suitable nonwoven fabric for the application of hygienic goods, such as a diaper, and dressings, a HAPPU material base fabric, etc. Moreover, in addition to this, it can use also as a wiper and a wye BINGU cross. At this time, it becomes [aesthetic property] good by using a nonwoven fabric (I) side as facing and is desirable.

[0026]

[Example] Hereafter, although an example and the example of a comparison explain this invention to a detail, this invention is not limited at all by this. In addition, the vocabulary in an example and the example of a comparison and the measuring method of physical properties are as follows.

[0027] (1) Melt flow rate MFR(g / 10 minutes):JIS It measures based on the conditions 14 of Table 1 of K7210.

MI (g / 10 minutes) : JIS It measures based on the conditions 4 of Table 1 of K7210.

Not only the melt flow rate of thermoplastics, such as resin and resin, but measurement of the melt flow rate of said thermoplastics which received the heat history with spinning is performed by the above-mentioned approach. In addition, the polymer which uses a propylene as a principal component measures on condition that said MFR, and polyethylene system resin measures on condition that said MI.

[0028] (2) Melting point MP(°C):JIS of thermoplastics It measures based on K7122.

[0029] (3) The rate of dimension stability of a nonwoven fabric (dimensional stability)

It computed by the degree type from the width of face (A1) of the web (aggregate of fiber) before thermocompression bonding is carried out, and the width of face (A2) of the nonwoven fabric after thermocompression bonding.

rate (%) of dimension stability $= [(A1-A2) / A1] \times 100$ — it is shown that the numeric value of the rate of dimension stability called for in addition by the above-mentioned formula is excellent in dimensional stability, so that it is small. Thermocompression bonding was performed on thermocompression bonding temperature conditions given in Table 1.

[0030] (4) The organoleptics by the panelist of five nonwoven fabric aesthetic property were performed, and it estimated that the case where the case where the case where it is judged that all the members are soft is judged that A and more than trinomial are soft is judged that good and more than trinomial lack in a feeling of software was improper, and ** showed O and good and x showed the failure for A.

[0031] (5) Expanding recovery factor : JIS Based on L1096, using a measurement tensilon tension test machine, it is grip spacing of 10cm, 10cm of trial length, and speed-of-testing the conditions for /of 10cm about a test piece with a width of face [of 5cm], and a die length of 20cm, and is 12cm. After ****(ing), it was made to pass for 1 minute in the condition, and it returned to the original location at the same rate as a degree, the load was canceled, die-length [after neglect] L (cm) was measured for 3 minutes, and the expanding recovery factor was computed by the degree type.

Expanding recovery-factor (%) $= [(12-L) / 2] \times 100$ [0032] (6) when the measurement thermoplasticity compound continuous glass fiber of **** had the fiber cross section of a side-by-side mold, using the scanning electron microscope, the surface photograph of this compound continuous glass fiber was taken, and the ratio which resin (A) has covered from the image of the cross-section photograph to the periphery of this compound continuous glass fiber cross section was computed () (unit: %)

[0033] As one to example 3 resin (B), MFR is the crystalline polypropylene (homopolymer) of 10 as resin (A), MFR an ethylene unit on the weight criteria of 15 and a ternary polymerization object 3 % of the weight, The propylene / ethylene / butene-1 ternary polymerization object which includes a propylene unit for a butene-1 unit 92% of the weight 5% of the weight are used. By the well-known span bond method, using the spinneret of a side-by-side mold, introduce into the Ayr soccer the bicomponent fiber group breathed out from the spinneret, and towage extension is carried out. 50%, **** of resin (A) obtains the compound continuous glass fiber of 2dtex, and continues. After making electrification equipment give this charge and electrifying said continuous glass fiber group discharged from the Ayr soccer, it was made to collide with a reflecting plate, and opened, uptake of the opened continuous glass fiber group was carried out as a continuous glass fiber web on the endless network-like conveyor which formed the aspirator in the rear face, and this was used for the nonwoven fabric (I). the same — the span bond method — the spinneret of this cardiac sheath-core type — using — as the resin of a heart component — the duality in which MFR includes [MFR / the crystalline polypropylene (homopolymer) of 10] a propylene unit for 16 and an ethylene unit 95% of the weight 5% of the weight as resin (A') of a sheath component — using the copolymer, the compound continuous glass fiber of 2dtex was obtained, it carried out uptake, having used this as the web, and it used for the nonwoven fabric (II). What carried out the laminating so that a nonwoven fabric (I) might be come to a lower layer and a nonwoven fabric (II) might be come to the upper layer (example 1), What carried out the laminating so that a nonwoven fabric (I) might be come to the upper layer and a nonwoven fabric (II) might be come to a lower layer (example 2), Set what carried out the laminating so that a nonwoven fabric (I) might be come to a middle lamella and a nonwoven fabric (II) might be come to a vertical layer (example 3) as each thermocompression bonding temperature given in Table 1. Thermocompression bonding processing was carried out with the embossing machine of the linear pressure of 20Ns/mm, and 10% of rates of area, after that, each crimp temperature given in Table 1 was given, and the elasticity compound-ized nonwoven fabric of this invention was obtained. All were excellent in dimensional stability, aesthetic property, and expanding recoverability.

[0034] the propylene/ethylene with which MFR includes a propylene unit for an ethylene unit 98% of the weight 2% of the weight by 15 as example 4 resin (B) — duality — a copolymer — as resin (A) Using the propylene / ethylene / butene-1 ternary polymerization object with which an ethylene unit is included 3% of the weight, and it includes a propylene unit for a butene-1 unit

92% of the weight 5% of the weight on the weight criteria of 15 and a ternary polymerization object, MFR performed spinning using the spinneret of an eccentric sheath-core type by the same span bond method as an example 1, obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (I). Next, it considered as the resin of a heart component, and as resin (A') of a sheath component, the consistency used the crystalline polypropylene (homopolymer) of 10, 0.959 and MI used the high density polyethylene of 13, and MFR performed spinning using the spinneret of this cardiac sheath-core type by the same span bond method as an example 1, obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that a nonwoven fabric (II) might come to the upper layer, and the elasticity compound-ized nonwoven fabric of this invention was obtained so that a nonwoven fabric (I) might come to a lower layer. As it saw in Table 1, they were dimensional stability, aesthetic property, and the thing that is excellent in expanding recoverability.

[0035] the propylene/ethylene with which MFR includes a propylene unit for 15 and an ethylene unit 98% of the weight 2% of the weight as example 5 resin (B) — duality — a copolymer — as resin (A) The consistency used 0.959, MI used the high density polyethylene of 13, spinning was performed using the spinneret of a side-by-side mold by the same span bond method as an example 1, and 45%, **** of resin (A) obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (I). Next, as resin (A'), the consistency used 0.935, MI used the straight chain-like low density polyethylene of 20 as a single component, the continuous glass fiber of 2dtex(es) was obtained by the same span bond method as an example 1, and this was used for the nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that a nonwoven fabric (I) might be come to a lower layer and a nonwoven fabric (II) might be come to the upper layer, and the elasticity compound-ized nonwoven fabric of this invention was obtained. As it saw in Table 1, they were dimensional stability, aesthetic property, and the thing that is excellent in expanding recoverability.

[0036] the propylene/ethylene with which MFR includes a propylene unit for 15 and an ethylene unit 98% of the weight 2% of the weight as example 6 resin (B) — duality — a copolymer — as resin (A) The consistency used 0.935, MI used the straight chain-like low density polyethylene of 20, spinning was performed using the spinneret of a side-by-side mold by the same span bond method as an example 1, and 45%, **** of resin (A) obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (I). Next, it considered as the resin of a heart component, and as resin (A') of a sheath component, the consistency used the crystalline polypropylene (homopolymer) of 10, 0.918 and MI used the low density polyethylene of 24, and MFR performed spinning using the spinneret of this cardiac sheath-core type by the same span bond method as an example 1, obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that a nonwoven fabric (I) might be come to the upper layer and a nonwoven fabric (II) might be come to a lower layer, and the elasticity compound-ized nonwoven fabric of this invention was obtained. As it saw in Table 1, they were dimensional stability, aesthetic property, and the thing that is excellent in expanding recoverability. When this nonwoven fabric was furthermore used as facing of the diaper for adults, it excelled in aesthetic property, nonwoven fabric strength, etc., and was very good as absorptivity goods.

[0037] As example of comparison 1 thermoplastics, MFR used the propylene / ethylene / butene-1 ternary polymerization object with which an ethylene unit is included 4% of the weight, and it includes a propylene unit for a butene-1 unit 94% of the weight 2% of the weight on the weight criteria of 15 and a ternary polymerization object as a single component, performed spinning by the same span bond method as an example 1, obtained the continuous glass fiber of 2dtex(es), and used this for the nonwoven fabric (I). Next, as resin (A'), the consistency used 0.959, MI used the high density polyethylene of 13 as a single component, spinning was performed by the same span bond method as an example 1, the continuous glass fiber of 2dtex was obtained, and this was used for the nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that a nonwoven fabric (I) might be come

to a middle lamella and a nonwoven fabric (II) might be come to a vertical layer, and the laminating nonwoven fabric was obtained. If this laminating nonwoven fabric did not make it the dimensional stability at the time of heat adhesion processing mist or more than the melting point of the fiber which is inferior and constitutes a nonwoven fabric (I) for crimp temperature, a heat shrink did not happen. At that time, the resin (A') of a nonwoven fabric (II) welded, since fiber was non-crimp nature, the obtained nonwoven fabric was inferior to expanding recoverability, and aesthetic property is bad and it was unsuitable for use of a ** material application etc.

[0038] the propylene/ethylene with which MFR includes a propylene unit for 15 and an ethylene unit 98% of the weight 2% of the weight as example of comparison 2 resin (B) — duality — a copolymer — as resin (A) The consistency used 0.935, MI used the straight chain-like low density polyethylene of 20, spinning was performed using the spinneret of a side-by-side mold by the same span bond method as an example 1, and 50%, **** of resin (A) obtained the compound continuous glass fiber of 2dtex, and used this as a nonwoven fabric (I). Next, it considered as the resin of a heart component, and as resin (A') of a sheath component, the consistency used the crystalline polypropylene (homopolymer) of 10, 0.959 and MI used the high density polyethylene of 13, and MFR performed spinning using the spinneret of this cardiac sheath-core type by the same span bond method as an example 1, obtained the compound continuous glass fiber of 2dtex, and used this as a nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that a nonwoven fabric (I) might be come to the upper layer and a nonwoven fabric (II) might be come to a lower layer, and the laminating nonwoven fabric was obtained. since this laminating nonwoven fabric was a little inferior to dimensional stability and thermocompression bonding temperature was set as the temperature which does not cause a contraction operation of a nonwoven fabric (I) — since heat adhesion is inadequate — nonwoven fabric strength — low — moreover, the time of expanding — fiber — base — the omission and the expanding recovery factor were greatly inferior.

[0039] as example of comparison 3 resin (B) — the propylene/ethylene with which MFR includes [MFR / the crystalline polypropylene (homopolymer) of 10] a propylene unit for 15 and an ethylene unit 95% of the weight 5% of the weight as resin (A) — duality — spinning was performed using the spinneret of a side-by-side mold using the copolymer by the same span bond method as an example 1, the compound continuous glass fiber of 2dtex was obtained, and this was used for the nonwoven fabric (I). Next, as resin of a heart component, MFR is the crystalline polypropylene (homopolymer) of 10 as resin (A') of a sheath component, MFR performed spinning using the spinneret of this cardiac sheath-core type using the propylene / ethylene / butene-1 ternary polymerization object with which an ethylene unit is included 3% of the weight, and it includes a propylene unit for a butene-1 unit 92% of the weight 5% of the weight on the weight criteria of 15 and a ternary polymerization object by the same span bond method as an example 1, and 60%, **** of resin (A) obtained the compound continuous glass fiber of 2dtex, and used this for the nonwoven fabric (II). The same processing as an example 1 was performed for what carried out the laminating so that it might become a lower layer about a nonwoven fabric (I) and might become the upper layer about a nonwoven fabric (II), and the laminating nonwoven fabric was obtained. Since this laminating nonwoven fabric had the melting point of the resin (A') of a nonwoven fabric (II) higher than the melting point of the resin (A) of a nonwoven fabric (I), contraction of a nonwoven fabric (I) took place at the time of thermocompression bonding processing, its aesthetic property was bad and the problem was in dimensional stability and formation. Moreover, it was what the crimp at the time of crimp processing is eased in the contraction operation at the time of thermocompression bonding, and whose sufficient crimp is not discovered, and is inferior to expanding recoverability.

[0040]

[Table 1]

不織布	実施例1	実施例2	実施例3	実施例4	実施例5	実施例6	比較例1	比較例2	比較例3
	PP	PP	PP	Co-PP	Co-PP	Co-PP	Co-PP	Co-PP	Co-PP
不織布(I)	繊維(白)	158	158	158	150	150	—	150	158
	融点(°C)	40	40	40	50	45	—	40	30
	繊維(白)	Co-PP	Co-PP	Co-PP	HDPE	LDPE	Co-PP	LDPE	Co-PP
	融点(°C)	140	140	140	128	125	135	125	130
不織布(II) 上層	繊維(白)	40	40	40	40	40	40	40	40
	融点(°C)	10	10	10	10	7.5	10	10	7.5
	繊維(白)	PP	PP	PP	—	—	—	—	PP
	融点(°C)	158	158	158	—	—	—	—	158
不織布(II) 下層	繊維(白)	Co-PP	Co-PP	HDPE	LDPE	—	HDPE	—	Co-PP
	融点(°C)	130	130	128	125	—	128	—	140
	繊維(白)	40	40	35	40	—	30	40	40
	融点(°C)	7.5	7.5	5	10	—	7.5	—	10
熱処理後目付	繊維(白)	PP	PP	PP	—	—	PP	PP	—
	融点(°C)	158	158	158	—	—	158	158	—
	繊維(白)	Co-PP	Co-PP	Co-PP	—	—	HDPE	HDPE	—
	融点(°C)	130	130	130	—	—	128	128	—
熱処理後目付	繊維(白)	40	40	40	—	—	40	40	—
	融点(°C)	10	10	10	—	—	7.5	10	—
	繊維(白)	110	115	120	110	105	115	105	120
	融点(°C)	4	6	3	5	7	10	15	40
熱処理後目付	繊維(白)	125	125	125	125	115	135	120	125
	融点(°C)	—	—	—	—	—	—	—	—
	繊維(白)	100	100	100	100	88	80	25	85
	融点(°C)	100	98	95	100	95	70	35	80
熱処理後目付	繊維(白)	22	25	35	28	27	45	29	27
	融点(°C)	—	—	—	—	—	—	—	—
	繊維(白)	—	—	—	—	—	—	—	—
	融点(°C)	—	—	—	—	—	—	—	—

PP : ポリプロピレン
 Co-PP : プロピレン系重合体
 HDPE : 高密度ポリエチレン
 LLDPE : 直鎖状低密度ポリエチレン
 LDPE : 低密度ポリエチレン
 カットシート : 糸糸後の値
 融点 : 糸糸後の値
 目付 : 加工 (熱処理) 前の数値
 熱処理後目付 : 加工 (熱処理) 後の数値
 伸長回復率 (CD) : 機方向
 伸長回復率 (MD) : 縦方向

[0041]

[Effect of the Invention] Since, as for the elasticity compound-ized nonwoven fabric of this invention, a nonwoven fabric (I) takes the structure of three-dimensions crimp, a nonwoven fabric is excellent in elasticity and elasticity, and has still better aesthetic property. In addition, it excels in dimensional stability and has practically sufficient nonwoven fabric strength.

[Translation done.]

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(54) 【発明の名称】 伸縮性複合化不織布及びこれを用いた吸収性物品

(57) 【要約】

【課題】 風合いに優れ、更に高い伸長回復性を有して
いて、オムツ等の衛生材料および包帯、ハップ材基布等
の用途に好適な不織布を提供すること。

【解決手段】 樹脂 (B) と、樹脂 (B) より低い融点
を有する樹脂 (A) を用いて得られた熱可塑性複合長繊維
が三次元捲縮を発現して絡合している不織布 (I)
と、該不織布 (I) の片面または両面に、前記樹脂
(A) より低い融点を有する樹脂 (A') を用いて得ら
れた熱可塑性繊維からなる不織布 (II) を配した積層不
織布であって、不織布 (I) と不織布 (II) が、樹脂
(A') を用いて得られた前記熱可塑性繊維の熱溶融に
よって部分熱接合されており、該積層不織布の縦方向及
び横方向の20%伸長時の伸長回復率がいずれも90%
以上であることを特徴とする伸縮性複合化不織布。

【特許請求の範囲】

【請求項1】 樹脂(B)と、樹脂(B)より低い融点を有する樹脂(A)を用いて得られた熱可塑性複合長繊維が三次元捲縮を発現して絡合している不織布(I)と、該不織布(I)の片面または両面に、前記樹脂(A)より低い融点を有する樹脂(A')を用いて得られた熱可塑性繊維からなる不織布(II)を配した積層不織布であって、不織布(I)と不織布(II)が、樹脂(A')を用いて得られた前記熱可塑性繊維の熱溶解によって部分熱接合されており、該積層不織布の縦方向及び横方向の20%伸長時の伸長回復率がいずれも90%以上であることを特徴とする伸縮性複合化不織布。

【請求項2】 積層不織布の樹脂(A)と樹脂(A')が、同一成分系樹脂である請求項1記載の伸縮性複合化不織布。

【請求項3】 樹脂(A)、及び樹脂(A')が、低密度ポリエチレン、直鎖状低密度ポリエチレン、高密度ポリエチレン、プロピレン系二元共重合体、及びプロピレン系三元共重合体から選ばれた少なくとも1種のオレフィン系樹脂である請求項1または請求項2記載の伸縮性複合化不織布。

【請求項4】 不織布(I)が、サイドバイサイド型、または偏心鞘芯型の繊維断面を有する熱可塑性複合長繊維からなる不織布である請求項1～3のいずれか1項記載の伸縮性複合化不織布。

【請求項5】 プロピレン系二元共重合体が、プロピレン単位を85～99重量%、エチレン単位を1～15重量%含むプロピレン/エチレン二元共重合体である請求項3記載の伸縮性複合化不織布。

【請求項6】 プロピレン系二元共重合体が、プロピレン単位を50～99重量%、ブテン-1単位を1～50重量%含むプロピレン/ブテン-1二元共重合体である請求項3記載の伸縮性複合化不織布。

【請求項7】 プロピレン系三元共重合体が、該三元共重合体の重量基準で、プロピレン単位を84～98重量%、エチレン単位を1～10重量%、ブテン-1単位を1～15重量%含むプロピレン/エチレン/ブテン-1三元共重合体である請求項3記載の伸縮性複合化不織布。

【請求項8】 請求項1～7のいずれか1項記載の伸縮性複合化不織布を用いた吸収性物品。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、伸縮性複合化不織布及びこれを用いた吸収性物品に関する。更に詳しくは、伸長回復性に富み、かつ風合いと成形性に優れた伸縮性複合化不織布及びこれを用いた吸収性物品等に関する。

【0002】

【従来の技術】長繊維を構成繊維とするスパンボンド不

織布は、短繊維を構成繊維とする短繊維不織布と比べて、不織布強度が高く且つ生産性に優れるため、その価格を安価にすることができ、各種用途に用いられている。中でも使い捨てオムツ等、衛生材料の表面材として利用価値が高い。

【0003】しかし、これらスパンボンド不織布は高い強度を有する反面、用いられるフィラメントが非捲縮であるため、短繊維不織布に比べると、嵩高性に劣り、且つ風合いに問題があった。このため、高級感という点から衛生材料の表面材等に使用される量は、短繊維不織布に比べ、少ない状態で推移している。

【0004】一方、嵩高性や風合いに優位とされる短繊維不織布は、一般的に熱接着性複合繊維をカード工程や空気流開繊工程によってウェブとした後、熱風加工や熱圧着加工(エンボス加工)等の加熱処理によって繊維交絡点を融着することで製作される。特に熱圧着加工は熱風加工に比べ生産性に優れ、またコスト的にも有利である。しかしながら、最近の傾向として、衛生材料の表面材に用いられる熱圧着された短繊維不織布には、より柔らかい風合い(触感)が要求されている。そのため、熱処理温度を抑えた加工が施されている。しかしながら、その結果、不織布の接着が不充分となり、不織布強度が弱く、接着部分が損傷し易くなり、短繊維の端が不織布表面に突出する、いわゆる毛羽立ちが起こりやすい(耐摩耗性の低下)。また、熱圧着された短繊維不織布は、得られる不織布の厚さ(嵩高性)がエンボス凸部の高さに規制されてしまい、このため充分に嵩高な不織布が得られにくかった。

【0005】また、従来の加熱処理によって得られた不織布は伸長性があっても、伸縮性いわゆる伸長回復性や嵩高性に劣るものであった。そのため、長繊維を構成繊維とするスパンボンド不織布と短繊維を構成繊維とする短繊維不織布の、それぞれの特長を有する不織布の検討がなされており、特に生産性に有利であるスパンボンド不織布において、種々の製造方法が提案されている。

【0006】スパンボンド不織布に嵩高性を付与する方法として、特開平1-148862号公報に、構成繊維である長繊維に捲縮を与える方法が提案されている。これは、高分子重合体を異形の紡糸孔を持つ紡糸口金から溶融紡糸し、次いで高速気流で延伸固化する際に、この長繊維群の一方の側面を冷却処理することで長繊維群に捲縮を発現させた後、この長繊維群を熱接着し、一体化させるスパンボンド不織布の製造方法である。この効果は、長繊維の捲縮によって長繊維間隔の体積が大きくなって嵩高性が向上するものである。

【0007】この方法で得られるスパンボンド不織布は、非捲縮のスパンボンド不織布に比べ、嵩高で柔軟であるものの、開繊時に隣接する捲縮性長繊維同士が絡み合い、開繊が不良となり、良好な地合の不織布が得られにくい。また、熱圧着されるため、得られた不織布はエ

ンボス凸部の高さに嵩が規制されてしまい嵩高性についても充分でなかった。

【0008】この欠点を補うため、熱収縮の大きい連続長繊維ウェブの両面に熱収縮の小さい連続長繊維ウェブを積層後、熱圧着により一体化し、その後、更に加熱処理して熱収縮させるスパンボンド不織布の製造方法が特開平8-176947号公報に提案されている。

【0009】この方法では連続長繊維が非捲縮であるため紡糸時の開繊性が良く、熱圧着後に加熱処理して収縮させるため、不織布はエンボス凸部の高さにその嵩が規制されないため、嵩高な不織布が得られるが、構成する長繊維が単一成分の樹脂からなるため、加熱処理して収縮した不織布は繊維自体が収縮する非捲縮性繊維であり、伸長性であっても伸長回復性に劣るという欠点があった。また、熱圧着して積層間の固着を行う際、熱収縮の大きい連続長繊維が収縮しない温度で加工する必要があるため、加工温度範囲が狭く、また不織布間の接着強度が充分満足できるものではなかった。

【0010】

【発明が解決しようとする課題】本発明の目的は上記課題が解消された、伸長回復性と風合いに優れた嵩高な伸縮性複合化不織布及びそれを用いた吸収性物品を提供することにある。

【0011】

【課題を解決するための手段】本発明者らは、上記課題を解決すべく鋭意検討を重ねた結果、以下の構成を採用することにより所期の目的が達成される見通しを得て、本発明を完成するに至った。

(1) 樹脂(B)と、樹脂(B)より低い融点を有する樹脂(A)を用いて得られた熱可塑性複合長繊維が三次元捲縮を発現して絡合している不織布(I)と、該不織布(I)の片面または両面に、前記樹脂(A)より低い融点を有する樹脂(A')を用いて得られた熱可塑性繊維からなる不織布(II)を配した積層不織布であって、不織布(I)と不織布(II)が、樹脂(A')を用いて得られた前記熱可塑性繊維の熱溶融によって部分熱接合されており、該積層不織布の縦方向及び横方向の20%伸長時の伸長回復率がいずれも90%以上であることを特徴とする伸縮性複合化不織布。

(2) 積層不織布の樹脂(A)と樹脂(A')が、同一成分系樹脂である前記(1)項記載の伸縮性複合化不織布。

(3) 樹脂(A)、及び樹脂(A')が、低密度ポリエチレン、直鎖状低密度ポリエチレン、高密度ポリエチレン、プロピレン系二元共重合体、及びプロピレン系三元共重合体から選ばれた少なくとも1種のオレフィン系樹脂である前記(1)項または前記(2)項記載の伸縮性複合化不織布。

(4) 不織布(I)が、サイドバイサイド型、または偏心鞘芯型の繊維断面を有する熱可塑性複合長繊維から

なる不織布である前記(1)～(3)項のいずれか1項記載の伸縮性複合化不織布。

(5) プロピレン系二元共重合体が、プロピレン単位を85～99重量%、エチレン単位を1～15重量%含むプロピレン/エチレン二元共重合体である前記(3)項記載の伸縮性複合化不織布。

(6) プロピレン系二元共重合体が、プロピレン単位を50～99重量%、ブテン-1単位を1～50重量%含むプロピレン/ブテン-1二元共重合体である前記

10 (3)項記載の伸縮性複合化不織布。

(7) プロピレン系三元共重合体が、該三元共重合体の重量基準で、プロピレン単位を84～98重量%、エチレン単位を1～10重量%、ブテン-1単位を1～15重量%含むプロピレン/エチレン/ブテン-1三元共重合体である前記(3)項記載の伸縮性複合化不織布。

(8) 前記(1)～(7)項のいずれか1項記載の伸縮性複合化不織布を用いた吸収性物品。

【0012】

【発明の実施の形態】以下、本発明を詳細に説明する。
本発明の伸縮性複合化不織布は、潜在捲縮性を有する熱高収縮性の熱可塑性複合長繊維からなる不織布(I)と、その片面または両面に熱低収縮性の熱可塑性繊維からなる不織布(II)が積層され、両者を熱圧着により部分熱接合され、積層一体化した後、更に不織布(I)の捲縮温度で加熱処理を行うことにより、前記不織布(I)を構成している潜在捲縮性を持つ熱可塑性複合長繊維が立体的な三次元捲縮を発現して絡合している伸縮性複合化不織布である。

【0013】更に詳しくは本発明の伸縮性複合化不織布は、樹脂(A)と樹脂(B)とで構成された熱可塑性複合長繊維が三次元捲縮を発現して絡合している不織布(I)と該不織布(I)の片面または両面に、前記樹脂(A)より低い融点を有する樹脂(A')を用いて得られた熱可塑性繊維からなる不織布(II)を配した積層不織布であって、不織布(I)と不織布(II)が、樹脂(A')を用いて得られた前記熱可塑性繊維の熱溶融によって部分熱接合されており、積層不織布の縦方向及び横方向の20%伸長時の伸長回復率がいずれも90%以上を有している。

40 【0014】つまり、不織布(I)を構成している熱可塑性複合長繊維には、潜在捲縮性を有する熱高収縮性の複合長繊維を使用し、一方の不織布(II)を構成している熱可塑性繊維には、前記複合繊維より熱低収縮性の繊維を使用する。この不織布(I)の片面または両面に不織布(II)を積層させて、両者を不織布(II)の熱可塑性繊維を構成する樹脂(A')の熱溶融によって部分熱圧着して接合一体化している。その後、不織布(I)を構成している熱可塑性複合長繊維に加熱処理を施すことにより熱収縮させて捲縮を発現させる。この場合、熱可塑性複合長繊維と熱可塑性繊維の収縮差が大きい程、立

体構造を形成し、かつ伸長回復性に優れる不織布が得られる。また、熱可塑性複合長繊維に捲縮を発現させる温度、すなわち捲縮温度には該熱可塑性複合長繊維を構成する樹脂(A)の融点より5~30℃低い温度が用いられる。この加熱処理により熱可塑性複合長繊維には三次元捲縮が発現して見掛け長さが収縮する。つまり、不織布(I)を構成している熱可塑性複合長繊維の熱収縮応力により不織布(II)も引きずられて表面外観は緩やかなウェーブ状態(場合によってはクレープ状)を有するようになる。この際、三次元捲縮を発現した熱可塑性複合長繊維は、長繊維不織布で構成されているため、三次元捲縮発現による繊維の脱落、いわゆる素抜けがなく、また不織布強度が高くなる。

【0015】本発明の伸縮性複合化不織布は高な立体構造を有するので、極めてソフトな風合いを有し、かつ縦方向及び横方向のいずれも20%伸長時の伸長回復率が90%以上という優れた性能を有するのである。この伸長回復率90%以上ということは、本発明の伸縮性複合化不織布を例えばオムツ等の吸収性物品や包帯、ハップ材の基布等の二次製品として使用した場合、優れた風合いが付与されると同時に着用者の人間工学的見地に立って考えたとき、着用時の体位移動時にも無理なく伸縮し、追従できるため、着用者に不快感を与えることがない。

【0016】本発明の伸縮性複合化不織布において、不織布(I)と不織布(II)を一体化する方法として熱圧着加工が好ましい。熱圧着加工は熱風加工に比べ、熱と圧力による加工方法であるため、接着する樹脂(A')の融点より低い温度で加工できる利点がある。すなわち、潜在捲縮を有する熱可塑性複合長繊維が熱圧着加工により積層一体化される際、熱圧着時の熱により収縮作用が発生しないため好適に用いられる。なお、通常、熱圧着加工の条件は、樹脂(A')の軟化点以上の熱圧着加工温度、10~100N/mmの線圧が適宜選択される。また、熱圧着する融着区域の面積は捲縮処理前の不織布面積に対し、4~30%の範囲が好ましく、より好ましくは5~25%である。融着区域の面積が4%未満では不織布積層間の層間剥離が生ずる傾向にあり、30%を大幅に越えると捲縮作用を阻害し、嵩高性を抑える傾向となる。

【0017】本発明において不織布(I)の樹脂(A)が、不織布(II)の樹脂(A')より融点が高い場合、樹脂(A')を接着成分として熱圧着により溶着することができ、不織布(I)の収縮作用を制御し、更には積層間の部分熱接合が強固になり、層間剥離を制御できる。しかし、逆に樹脂(A')の融点が樹脂(A)より高い場合、樹脂(A')を熱圧着する際に加熱加工の熱により不織布(I)が収縮を起こすことや、長繊維同士が融着または接着を起こし、結果、寸法安定性が損なわれ、更に捲縮処理時に熱可塑性複合繊維が十分に立体捲

縮を発現し難くなる。樹脂(A)と樹脂(A')との組み合わせとしては、融点差を有する同一成分系樹脂が更に積層間の剥離防止に有利である。

【0018】本発明に用いられる樹脂(A)及び樹脂(A')としては、通常工業的に利用されているポリエチレン樹脂が好ましく用いられ、密度が0.910~0.925g/cm³の低密度ポリエチレン、密度が0.926~0.940g/cm³の直鎖状低密度ポリエチレン、密度が0.941~0.980g/cm³の高密度ポリエチレンが例示できる。メルトフローレート(MI:JIS K7210表1中の条件4に準拠して測定した値)は2~100g/10分の範囲が好ましい。その中から熱可塑性複合長繊維の樹脂(A)と、これより低い融点を有する樹脂(A')とを任意で選ぶことができる。なお、樹脂(A)と樹脂(A')の融点差は、3℃以上が好ましく、より好ましくは5℃以上である。

【0019】本発明において樹脂(A)、及び樹脂(A')に用いられるプロピレン系二元共重合体、及びプロピレン系三元共重合体とは、プロピレンを主成分とし、それと少量のエチレン、ブテン-1、ヘキサン-1、オクテン-1、若しくは4-メチルペンテン-1等のαオレフィンとの結晶性共重合体であって、メルトフローレート(MFR:JIS K7210 表1中の条件14に準拠して測定した値)が3~50g/10分、融点が120~158℃の範囲が好適に用いられる。具体例としては、プロピレン単位を99~85重量%、エチレン単位を1~15重量%含むプロピレンを主体とするプロピレン/エチレン二元共重合体、プロピレン単位を99~50重量%、ブテン-1単位を1~50重量%含むプロピレンを主体とするプロピレン/ブテン-1二元共重合体、あるいは三元共重合体の重量基準でプロピレン単位を84~98重量%、エチレン単位を1~10重量%、ブテン-1単位を1~15重量%含むプロピレン/エチレン/ブテン-1三元共重合体が挙げられる。その中から樹脂(A)と、これよりも、低い融点を有する樹脂(A')とを任意で選ぶことができる。前記樹脂(A)と樹脂(A')の融点差は3℃以上が好ましく、より好ましくは5℃以上である。

【0020】本発明に用いられる熱可塑性複合長繊維を構成する樹脂(B)は前記樹脂(A)より、少なくとも10℃以上高い融点を有する熱可塑性樹脂を任意で選ぶことができる。好ましくはホモポリプロピレン、若しくはプロピレンを主成分とし、それと少量のエチレン、ブテン-1、ヘキサン-1、オクテン-1、若しくは4-メチルペンテン-1等のαオレフィンとの結晶性共重合体であって、MFRが2~150g/10分、融点が130~158℃のものが有用である。

【0021】本発明に用いられる熱可塑性複合長繊維は潜在捲縮性の長繊維であり、スパンボンド法により好適

に製造されうる。潜在捲縮を持つ熱可塑性複合長繊維としては、具体的には、熱収縮率の異なる樹脂(A)と樹脂(B)からなる熱可塑性複合長繊維が挙げられる。該複合長繊維の構造は、融点が10℃以上異なる2種の熱可塑性樹脂をサイドバイサイド型、または、樹脂(A)を鞘成分とする偏心鞘芯型に配した複合長繊維であり、樹脂(A)の融点以下、特に樹脂(A)の融点より5～30℃低い温度範囲内の温度で加熱処理(捲縮処理)を行うことにより、立体的な三次元捲縮を発現させることができる。本発明では、前記温度範囲を捲縮温度とした。

【0022】本発明において不織布(I)の熱可塑性複合長繊維を得るには、前述の樹脂(A)、樹脂(B)をサイドバイサイド型、偏心鞘芯型の断面となる紡糸口金を用い、公知のスパンボンド法により製造することができる。この際、サイドバイサイド型の紡糸口金の場合、樹脂(A)及び樹脂(B)の押出温度(紡糸温度)を変更することで、樹脂(A)及び樹脂(B)の紡糸メルトフローレートを調整して、樹脂(A)と樹脂(B)との繊維断面の捲率を設定する。複合長繊維を構成する樹脂(A)及び樹脂(B)の比率は、その重量比が、樹脂(A)/樹脂(B)=20/80～80/20重量%の範囲が好ましく、より好ましくは40/60～60/40重量%である。樹脂(A)が20%未満では捲縮処理を行った際、立体捲縮が発現し難く、伸張回復性が乏しくなる。また、樹脂(A)が80%を超すと、熱圧着時に収縮が起こり、寸法安定性が低下する傾向になる。熱可塑性複合長繊維の繊度は、0.55～11dtexの範囲が好ましく、より好ましくは0.55～6dtexである。不織布(I)の目付は5～40g/m²の範囲が好ましく、より好ましくは8～30g/m²である。単糸繊度が0.55dtex未満では、紡糸時に安定した可紡性が得られ難く、さらには均一な地合を得ることが困難となる。一方、11dtexを超えると不織布の肌触りが著しく悪くなる傾向になる。また、目付が5g/m²未満では充分な不織布強力を得られず、40g/m²を超えると不織布強力は充分であるものの、肌触りが悪くなる傾向になる。

【0023】本発明に用いられる不織布(II)を構成する熱可塑性繊維としては、樹脂(A)の融点未満の融点を有している樹脂(A')を用いて得られた熱可塑性繊維であれば、どのような繊維構成であっても構わない。例えば、短繊維や長繊維であってもよく、また、繊維の樹脂構成は単一繊維や複合繊維でもよい。繊維構成が複合繊維の場合、前述の熱可塑性複合長繊維と同様の樹脂構成でもよい。さらに樹脂(A')が、樹脂(A)と同一成分系樹脂であれば不織布(I)と不織布(II)との不織布積層間の固着がより強くなり非常に好ましい。また、不織布(II)の目付は、積層する不織布(I)との目付比(不織布(II)の目付/不織布(I)の目付)

で、0.2～4となることが好ましい。特に好ましくは0.3～3である。目付比が4を越えると捲縮を発現させるために、加熱処理を行った際、不織布(II)により、不織布(I)の立体捲縮が発現し難くなる。

【0024】本発明で用いられる樹脂(A)、樹脂(A')、及び樹脂(B)の熱可塑性樹脂には、本効果を妨げない範囲内でさらに酸化防止剤、光安定剤、紫外線吸収剤、中和剤、造核剤、エポキシ安定剤、滑材、抗菌剤、難燃剤、帯電防止剤、顔料、可塑剤、及び親水剤等を適宜必要に応じて添加しても良い。

【0025】本発明の伸縮性複合化不織布は高高度風合いに優れ、更に高い伸長回復性を有していて、オムツ等の衛生材料及び包帯、ハップ材基布等の用途に好適な不織布を提供できる。また、その他ワイパー、ワイピングクロスとしても用いることができる。このとき、不織布(I)側を表面材として用いることで風合いが良好となり好ましい。

【0026】

【実施例】以下、本発明を実施例及び比較例によって詳細に説明するが、本発明はこれによってなんら限定されるものではない。なお実施例、比較例における用語と物性の測定方法は以下の通りである。

【0027】(1)メルトフローレート

MFR(g/10分):JIS K7210の表1の条件14に準拠して測定。

MI(g/10分):JIS K7210の表1の条件4に準拠して測定。

樹脂、樹脂等の熱可塑性樹脂のメルトフローレートだけでなく、紡糸により熱履歴を受けた前記熱可塑性樹脂のメルトフローレートの測定も、上記方法により行う。なお、プロピレンを主成分とする重合体は前記MFRの条件で測定を行い、ポリエチレン系樹脂は前記MIの条件で測定を行う。

【0028】(2)熱可塑性樹脂の融点

MP(℃):JIS K7122に準拠して測定。

【0029】(3)不織布の寸法安定率(寸法安定性) 熱圧着される前のウェブ(繊維の集合体)の幅(A1)と熱圧着後の不織布の幅(A2)とから次式により算出した。

寸法安定率(%)={ (A1-A2)/A1 }×100
なお上記式で求められた寸法安定率の数値は小さいほど寸法安定性に優れていることを示している。熱圧着は表1記載の熱圧着温度条件で行った。

【0030】(4)不織布風合い

5人のパネラーによる官能試験を行い、全員がソフトであると判断した場合を優、3名以上がソフトであると判断した場合を良、3名以上がソフト感到欠けると判断した場合を不可と評価し、優を○、良を△、不可を×で示した。

【0031】(5)伸長回復率:JIS L1096に

準拠して測定

テンシロン引張試験器を用いて、幅5cm、長さ20cmの試験片をつかみ間隔10cm、試長10cm、引張速度10cm/分の条件で12cmまで引張した後に、その状態で1分間経過させ、次に同じ速度で元の位置まで戻して荷重を解除し、3分間放置後の長さL(cm)を測定し、次式により伸長回復率を算出した。

$$\text{伸長回復率}(\%) = \{(12 - L) / 2\} \times 100$$

【0032】(6) 捲率の測定

熱可塑性複合長繊維がサイドバイサイド型の繊維断面を有する場合、走査型電子顕微鏡を用いて、該複合長繊維の表面写真を撮影し、その断面写真の画像から該複合長繊維断面の円周に対して、樹脂(A)が被覆している比率を算出した(単位:%)

【0033】実施例1~3

樹脂(B)として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、樹脂(A)として、MFRが15、三元共重合体の重量基準でエチレン単位を3重量%、ブテン-1単位を5重量%、プロピレン単位を92重量%含むプロピレン/エチレン/ブテン-1三元共重合体を用いて、公知のスパンボンド法でサイドバイサイド型の紡糸口金を用い、紡糸口金から吐出した複合繊維群をエアーサッカードに導入して牽引延伸し、樹脂(A)の捲率が50%、2dtexの複合長繊維を得、続いて、エアーサッカードより排出された前記長繊維群を、帯電装置により同電荷を付与せしめ帯電させた後、反射板に衝突させて開繊し、開繊した長繊維群を裏面に吸引装置を設けた無端ネット状コンベア上に、長繊維ウェブとして捕集し、これを不織布(I)に用いた。同様にスパンボンド法で同心鞘芯型の紡糸口金を用い、芯成分の樹脂として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、鞘成分の樹脂(A')として、MFRが16、エチレン単位を5重量%、プロピレン単位を95重量%含む二元共重合体を用いて、2dtexの複合長繊維を得、これをウェブとして捕集し、不織布(II)に用いた。不織布(I)を下層に不織布(II)を上層に積層したもの(実施例1)、不織布(I)を上層に不織布(II)を下層に積層したもの(実施例2)、不織布(I)を中層に不織布(II)を上下層に積層したもの(実施例3)を表1記載の各々の熱圧着温度に設定した、線圧20N/mm、面積率10%のエンボス機で熱圧着処理し、その後、表1記載の各々の捲縮温度を付与して本発明の伸縮性複合化不織布を得た。いずれも寸法安定性、風合い、伸長回復性に優れたものであった。

【0034】実施例4

樹脂(B)として、MFRが15で、エチレン単位を2重量%、プロピレン単位を98重量%含むプロピレン/エチレン二元共重合体を、樹脂(A)として、MFRが15、三元共重合体の重量基準でエチレン単位を3重量

%、ブテン-1単位を5重量%、プロピレン単位を92重量%含むプロピレン/エチレン/ブテン-1三元共重合体を用い、実施例1と同様なスパンボンド法で偏心鞘芯型の紡糸口金を用いて紡糸を行い、2dtexの複合長繊維を得、これを不織布(I)に用いた。次に芯成分の樹脂として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、鞘成分の樹脂(A')として、密度が0.959、MIが13の高密度ポリエチレンを用いて、実施例1と同様なスパンボンド法で同心鞘芯型の紡糸口金を用いて紡糸を行い、2dtexの複合長繊維を得、これを不織布(II)に用いた。不織布(I)が下層にくるように、不織布(II)が上層にくるように積層したものを実施例1と同様の処理を行い、本発明の伸縮性複合化不織布を得た。表1に見られるように寸法安定性、風合い、伸長回復性に優れたものであった。

【0035】実施例5

樹脂(B)として、MFRが15、エチレン単位を2重量%、プロピレン単位を98重量%含むプロピレン/エチレン二元共重合体を、樹脂(A)として、密度が0.959、MIが13の高密度ポリエチレンを使用して実施例1と同様なスパンボンド法でサイドバイサイド型の紡糸口金を用いて紡糸を行い、樹脂(A)の捲率が45%、2dtexの複合長繊維を得、これを不織布(I)に用いた。次に樹脂(A')として、密度が0.935、MIが20の直鎖状低密度ポリエチレンを単一成分として使用し、実施例1と同様なスパンボンド法で2dtexの長繊維を得、これを不織布(II)に用いた。不織布(I)を下層に、不織布(II)を上層に積層したものを実施例1と同様の処理を行い、本発明の伸縮性複合化不織布を得た。表1に見られるように寸法安定性、風合い、伸長回復性に優れたものであった。

【0036】実施例6

樹脂(B)として、MFRが15、エチレン単位を2重量%、プロピレン単位を98重量%含むプロピレン/エチレン二元共重合体を、樹脂(A)として、密度が0.935、MIが20の直鎖状低密度ポリエチレンを使用して、実施例1と同様なスパンボンド法でサイドバイサイド型の紡糸口金を用いて紡糸を行い、樹脂(A)の捲率が45%、2dtexの複合長繊維を得、これを不織布(I)に用いた。次に芯成分の樹脂として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、鞘成分の樹脂(A')として、密度が0.918、MIが24の低密度ポリエチレンを使用して実施例1と同様なスパンボンド法で同心鞘芯型の紡糸口金を用いて紡糸を行い、2dtexの複合長繊維を得、これを不織布(II)に用いた。不織布(I)を上層に、不織布(II)を下層に積層したものを実施例1と同様の処理を行い、本発明の伸縮性複合化不織布を得た。表1に見られるように寸法安定性、風合い、伸長回復性に優れたものであった。さらに該不織布を大人用オムツの表面材とし

て使用したところ、風合い、不織布強力等に優れ、吸収性物品として非常に良好なものであった。

【0037】比較例1

熱可塑性樹脂として、MFRが15、三元共重合体の重量基準でエチレン単位を4重量%、ブテン-1単位を2重量%、プロピレン単位を94重量%含むプロピレン/エチレン/ブテン-1三元共重合体を単一成分として使用し、実施例1と同様なスパンボンド法で紡糸を行い2 d t e x の長繊維を得、これを不織布(I)に用いた。次に樹脂(A')として、密度が0.959、MIが13の高密度ポリエチレンを単一成分として使用して実施例1と同様なスパンボンド法で紡糸を行い、2 d t e x の長繊維を得、これを不織布(II)に用いた。不織布(I)を中層に、不織布(II)を上下層にくるように積層したものを実施例1と同様な処理を行い、積層不織布を得た。該積層不織布は熱接着処理時の寸法安定性にもやや劣り、捲縮温度を不織布(I)を構成する繊維の融点以上にしなければ熱収縮が起こらなかった。その際、不織布(II)の樹脂(A')が溶着してしまい、得られた不織布は風合いが悪く、また繊維が非捲縮性であるため伸長回復性に劣り、衛材用途等の使用に不向きなものであった。

【0038】比較例2

樹脂(B)として、MFRが15、エチレン単位を2重量%、プロピレン単位を98重量%含むプロピレン/エチレン二元共重合体を、樹脂(A)として、密度が0.935、MIが20の直鎖状低密度ポリエチレンを使用して実施例1と同様なスパンボンド法でサイドバイサイド型の紡糸口金を用いて紡糸を行い、樹脂(A)の捲率が50%、2 d t e x の複合長繊維を得、これを不織布(I)として用いた。次に芯成分の樹脂として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、鞘成分の樹脂(A')として、密度が0.959、MIが13の高密度ポリエチレンを使用して実施例1と同様なスパンボンド法で同心鞘芯型の紡糸口金を用いて紡糸を

行い、2 d t e x の複合長繊維を得、これを不織布(I)として用いた。不織布(I)を上層に、不織布(II)を下層にくるように積層したものを実施例1と同様な処理を行い、積層不織布を得た。この積層不織布は寸法安定性にやや劣り、熱圧着温度を不織布(I)の収縮作用を起こさない温度に設定したため、熱接着が不十分なため、不織布強力が低く、また伸長時に繊維が素抜け、伸長回復率が大きく劣っていた。

【0039】比較例3

樹脂(B)として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、樹脂(A)として、MFRが15、エチレン単位を5重量%、プロピレン単位を95重量%含むプロピレン/エチレン二元共重合体を使用して実施例1と同様なスパンボンド法でサイドバイサイド型の紡糸口金を用いて紡糸を行い、2 d t e x の複合長繊維を得、これを不織布(I)に用いた。次に芯成分の樹脂として、MFRが10の結晶性ポリプロピレン(ホモポリマー)を、鞘成分の樹脂(A')として、MFRが15、三元共重合体の重量基準でエチレン単位を3重量%、ブテン-1単位を5重量%、プロピレン単位を92重量%含むプロピレン/エチレン/ブテン-1三元共重合体を用い、実施例1と同様なスパンボンド法で同心鞘芯型の紡糸口金を用いて紡糸を行い、樹脂(A)の捲率が60%、2 d t e x の複合長繊維を得、これを不織布(II)に用いた。不織布(I)を下層に、不織布(II)を上層になるように積層したものを実施例1と同様な処理を行い、積層不織布を得た。この積層不織布は不織布(II)の樹脂(A')の融点が、不織布(I)の樹脂(A)の融点より高いため、熱圧着処理時に不織布(I)の収縮が起こり、風合いが悪く、寸法安定性及び地合に問題があった。また、熱圧着時の収縮作用で捲縮処理時の捲縮が緩和され、充分な捲縮が発現せず、伸長回復性に劣るものであった。

【0040】

【表1】

不織布	実測値1	実測値2	実測値3	実測値4	実測値5	実測値6	比較例1	比較例2	比較例3
	PP	PP	PP	Co-PP	Co-PP	Co-PP	Co-PP	Co-PP	PP
不織布(I)	153	153	153	150	150	150	-	150	153
	40	40	40	50	50	45	-	40	30
	140	140	140	140	128	125	Co-PP	LDPE	Co-PP
	40	40	40	40	40	40	135	125	130
不織布(II) 上層	10	10	10	15	10	7.5	10	10	15
	PP	PP	PP	PP	-	-	-	-	PP
	153	-	153	153	-	-	-	-	153
	30	-	30	30	-	-	-	-	40
不織布(II) 下層	130	-	130	128	125	-	HDPE	-	Co-PP
	40	-	40	35	40	-	128	-	40
	7.5	-	7.5	5	10	-	7.5	-	10
	PP	PP	PP	-	-	-	-	-	PP
不織布(II) 下層	110	115	120	110	105	100	115	105	120
	4	6	3	5	7	2	10	15	40
	125	125	125	125	115	115	125	120	125
	Q	Q	Q	Q	Q	Q	x	x	x
伸長回復率(MD)	100	100	100	100	98	98	80	75	85
	100	98	98	100	95	95	70	35	80
	22	25	35	28	27	25	45	28	27
	PP	PP	PP	PP	PP	PP	PP	PP	PP

PP : ポリプロピレン
 Co-PP : プロピレン系共重合体
 HDPE : 高密度ポリエチレン
 LLDPE : 直鎖状低密度ポリエチレン
 LDPE : 低密度ポリエチレン
 実測値 : 実測後の値
 目付 : 加工 (熱圧着) 後の値
 伸長回復率 (MD) : 加工 (熱圧着) 後の値
 伸長回復率 (CD) : 横方向
 伸長回復率 (MD) : 縦方向

【0041】

* 性と伸縮性に優れ、更に良好な風合いを有する。加えて

【発明の効果】本発明の伸縮性複合化不織布は、不織布 40 寸法安定性に優れ、かつ実用上充分な不織布強度を有する (I) が三次元捲縮の構造をとることから、不織布は弾* る。

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